

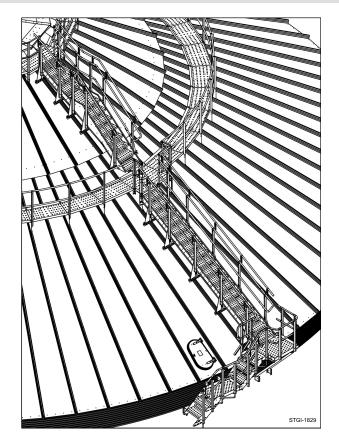
# **Mid-Roof Walk-Around Stairs**

# **Roof Accessories** Installation and Storage Instructions

This manual applies to:

#### **Commercial Super Bin Roof Diameters**

72' (21.94 m), 75' (22.86 m), 78' (23.77 m), 90' (27.43 m), 105' (32.00 m), and 135' (41.15 m)





Read this manual before using product. Failure to follow instructions and safety precautions can result in serious injury, death, or property damage. Keep manual for future reference.

Part Number: 4000026F R2 Revised: February 2025 Original Instructions

#### New in this Manual

The following changes have been made in this revision of the manual:

Description	Section
Aligned the front end matter with the current Westeel manuals.	Section 2. – Safety on page 5, Section 3. – Before You Begin on page 7, Section 4. – Preparation on page 10
Updated part numbers.	Various sections

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# **1. Introduction**

Before assembling, please read this manual. Familiarize yourself with the process and the necessary precautions for efficient and safe assembly of this AGI Mid-Roof Walk-Around Stairs.

Everyone present at the assembly site is required to be familiar with all safety precautions.

Keep this manual available for frequent reference and review it with new personnel. Call your local distributor or dealer if you need assistance or additional information.

# 2. Safety

# 2.1. Safety Alert Symbol and Signal Words



This safety alert symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury or death, carefully read the message that follows, and inform others.

**Signal Words:** Note the use of the signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTICE** with the safety messages. The appropriate signal word for each message has been selected using the definitions below as a guideline.

DANGER Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death.
 WARNING Indicates a hazardous situation that, if not avoided, could result in serious injury or death.
 CAUTION Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.
 NOTICE Indicates a potentially hazardous situation that, if not avoided, may result in property damage.

# 2.2. General Safety Information

Read and understand all safety instructions, safety decals, and manuals and follow them when assembling the equipment.

• Only experienced personnel who are familiar with this type of assembly and installation should perform this work. Untrained assemblers/installers expose themselves and bystanders to possible serious injury or death.



- Do not modify the mid-roof walk-around stairs in any way or deviate from the instructions in this manual without written permission from the manufacturer. Unauthorized modification or methods may impair the function and/or safety. Any unauthorized modification will void the warranty.
- Follow a health and safety program for your worksite. Contact your local occupational health and safety organization for information.
- Contact your local representative or AGI if you need assistance or additional information.
- Always follow applicable local codes and regulations.

## 2.3. Personal Protective Equipment

The following Personal Protective Equipment (PPE) should be worn when installing the equipment.

Safety Glasses



Wear safety glasses at all times to protect eyes from debris.

Coveralls



Wear coveralls to protect skin.

• Hard Hat



Wear a hard hat to help protect your head.

# 2.4. Safety Equipment

The following safety equipment should be kept on site.

• First-Aid Kit



Have a properly-stocked first-aid kit available for use should the need arise, and know how to use it.

# 2.5. Working At Height Safety

- Ensure that all work at height is properly planned, organized and carried out by a competent person.
- Use appropriate work equipment and make sure that they are inspected to ensure safety.
- Select collective measures to prevent falls (such as guard rails and working platforms) before other measures which may only reduce the distance and consequences of a fall (such as nets or air bags) or may only provide fall-arrest through personal protection equipment.
- Ensure that those persons working at height are trained in how to avoid falling and how to avoid or minimise any injuries should they fall.
- Check the weather condition. Postpone any work at height until there is no risk to the health and safety of any person working at height.
- Ensure that nothing is thrown or tipped from height if it is likely to injure a person.

Steel-Toe Boots



Wear steel-toe boots to protect feet from falling debris.

#### Work Gloves



Wear work gloves to protect your hands from sharp and rough edges.

# **3. Before You Begin**

## 3.1. Site and Assembly

Unless otherwise specifically provided in writing, AGI does not take responsibility for any defects or damages to any property, or injury to any persons, arising from or related to any site or assembly considerations, including but not limited to:

- Bin location and bin siting
- Soil conditions and corresponding foundation requirements (Note that the examples provided in manuals are for specifically stated soil conditions.)
- Bin assembly (AGI recommends the use of qualified bin installers. Contact AGI for information on installers in your area.)
- Field modifications or equipment additions that affect the bin structure
- Interconnections with neighboring structures
- Have the builder make all non-bin equipment in excess of AGI's recommendations. All such equipment including: LEGS, WALKWAYS, SPOUTING, and CONVEYORS must be self supporting.
- Compliance with all applicable safety standards, including but not limited to fall restraint systems (ladders or other systems). Contact local safety authorities as the standards vary between jurisdictions.

## **3.2.** Critical Assembly Requirements

To ensure a successful, safe and reliable outcome you must comply with the following assembly techniques and practices:

- 1. Comply with all local code and jurisdictional requirements applicable to your mid-roof walk-around stairs installation.
- 2. Make sure that the proper hardware is utilized for all bolted connections. If a shortage occurs, do not substitute. Take the necessary steps to obtain the proper hardware. Make sure nuts are tightened to the required torque values as specified in the appropriate assembly manual.
- 3. Comply with all assembly instructions provided in the appropriate assembly manual to make sure your whole mid-roof walk-around stairs is constructed safely.

### 3.3. Product Storage

If you won't be assembling the bin right away, store the bundles and boxes inside a building with good ventilation to prevent white or red rust from forming.

#### Note

White rust can be removed and does not cause permanent damage.

#### NOTICE Red rust causes permanent structural damage.

Do not assemble any part containing red rust.

If you can't store the bundles and boxes inside, follow the instructions below for outdoor storage.

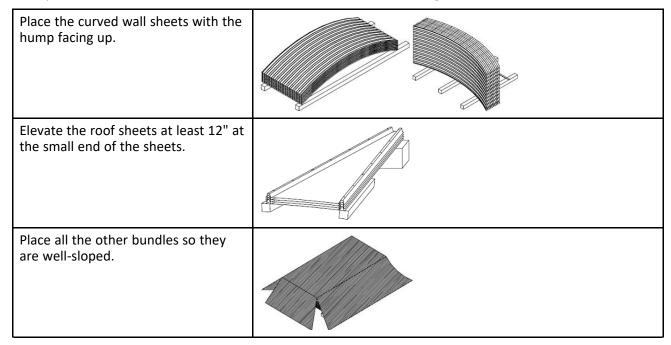
#### **Storing Bin Bundles and Boxes Outdoors**

**Required Materials:** 

- Wood blocks
- Waterproof tarp

Storage Procedure:

1. First, place the bundles and boxes on wood blocks about 6"-8" off the ground.



2. For the bin boxes, ladder boxes, and hardware boxes: build a simple framework to support, cover with a waterproof tarp, and secure.

#### Note

The boxes are not waterproof and will deteriorate in normal weather conditions, allowing moisture to contact the parts inside.

#### If Parts Become Wet

- 1. Open the bundles as soon as possible.
- 2. Separate and dry the bin sheets or parts. Keep the parts separated until assembly.

# ▲ WARNING Risk of injury or damage.

Brace parts securely to avoid damage or injury from material falling when in storage.

- 3. Dry any boxed parts that are wet and store them in a new, dry box.
- 4. After drying the wall sheets, apply a food-grade oil with a clean, lint-free cloth.

#### Note

Applying oil will help prevent moisture to contact with the dried wall sheets.

# **WARNING** Risk of slipping.

Do not use oil on roof sheets, ladders, or other parts where a person may walk or stand after the bin is assembled.

### 3.4. Important Notes

- AGI does not provide a foundation design for this product, and is not liable for any damages or injuries related to inadequately designed or constructed foundations. Customers must contract professional services for all foundation design and construction work.
- Contact local power officials for minimum power line clearance.
- Tighten all bolts to the recommended torque settings.

# **4. Preparation**

# 4.1. Check the Shipment

Unload the parts at the assembly site and compare the packing slip to the shipment. Ensure that all items have arrived and that none are damaged.

Report damaged parts or shortages immediately to your dealer. Your dealer will order replacement parts immediately to ensure that assembly will not be held up by missing parts. All parts will be charged for and credit will be issued by party at fault. No credit will be issued if freight bills are signed as received in good condition.

# 4.2. List of Tools and Equipment

Use quality tools and equipment. Use them safely, and correctly, for their intended use. Tools for this application should include:

#### Tools

- Electric or pneumatic (air) impact tools
- Power drill and drill bits
- Sockets (multiple 9/16" and 1/2" sockets recommended)
- Large-pocket carpenter pouch
- 8" (20 cm) metal punches (for aligning bolt holes)
- Step and extension ladders, construction grade
- 6-point wrenches (Imperial, box end)
- Metal-cutting saw suitable for cutting ladder sections
- Scaffolding

#### **Minimum Recommended Safety Equipment**

- A properly-stocked first-aid kit
- Eye, foot, head, and hand protection (safety glasses, steel-toed boots, hard hat, work gloves)
- Cable, chain, or rope to tie-off bin or jacks in case of wind
- Body harness and lifeline (for use where falling hazard exists)
- Ground fault interrupt protected electrical hook-ups

# 4.3. Order Optional Equipment

Optional equipment such as safety cages and platforms, etc., should all be on site and checked before assembly starts. Plan your installation in advance. For details, see assembly instruction supplied with optional equipment.

# **5. Assembly**

### 5.1. Assembly Safety

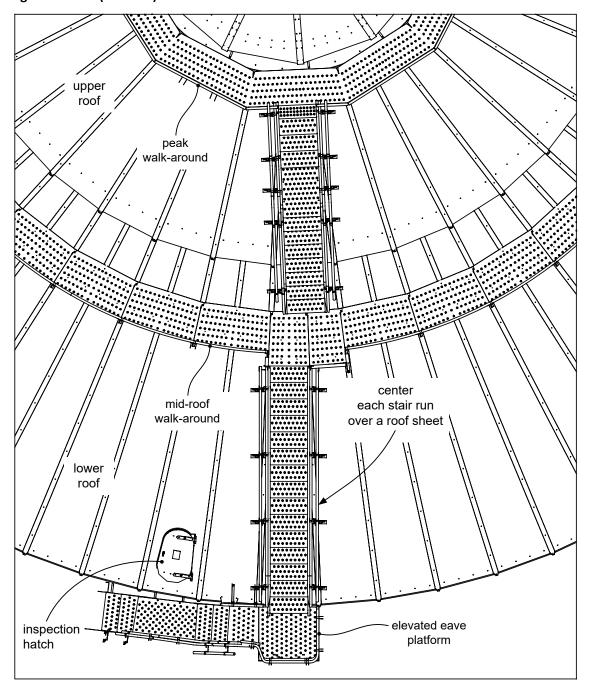
#### • Do not take chances with safety. The components can be large, heavy, and hard to handle. Always use the proper tools, rated lifting equipment, and lifting points for the job.

- Do not stand on, under, or near any component that is not secured.
- Carry out assembly in a large open area with a level surface.
- Always have two or more people assembling the mid-roof walk-around stairs.
- Make sure you have sufficient lighting for the work area.
- Tighten all fasteners according to their specifications. Do not replace or substitute bolts, nuts, or other hardware that is of lesser quality than the hardware supplied by the manufacturer.
- Stay away from overhead power lines and other obstructions during assembly. Contact with power lines can cause electrocution.
- Do not work in high winds.

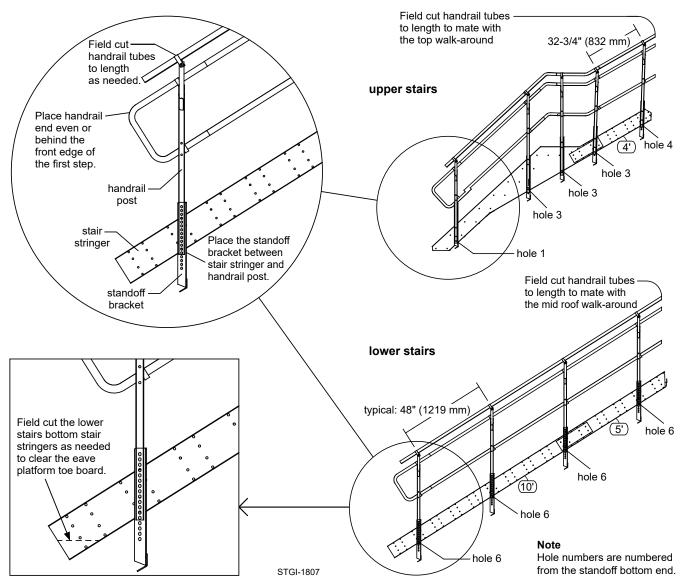
# 5.2. Roof Diameter Specific Assembly Layouts

### 5.2.1 72' (21.95 m) Assembly Layout Views

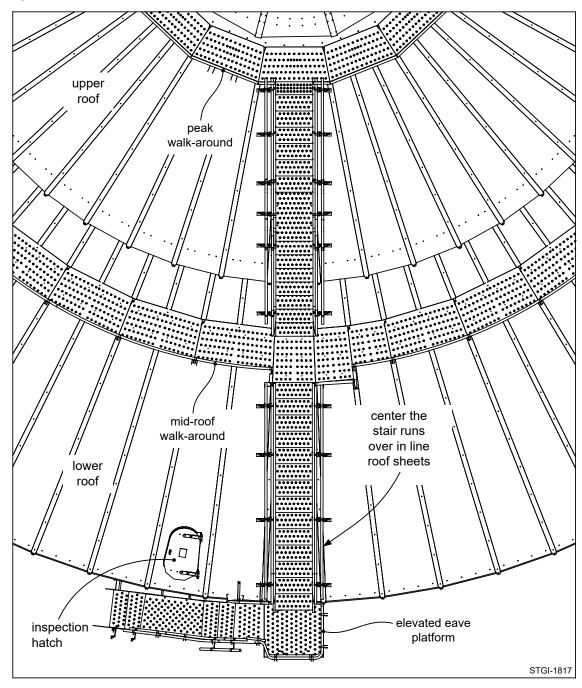
Figure 1. 72' (21.95 m) Plan View





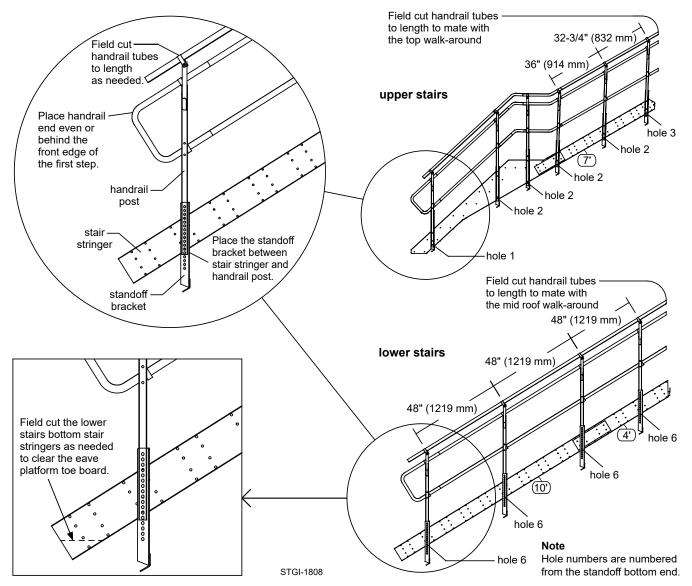


### 5.2.2 75' (22.86 m) Assembly Layout Views

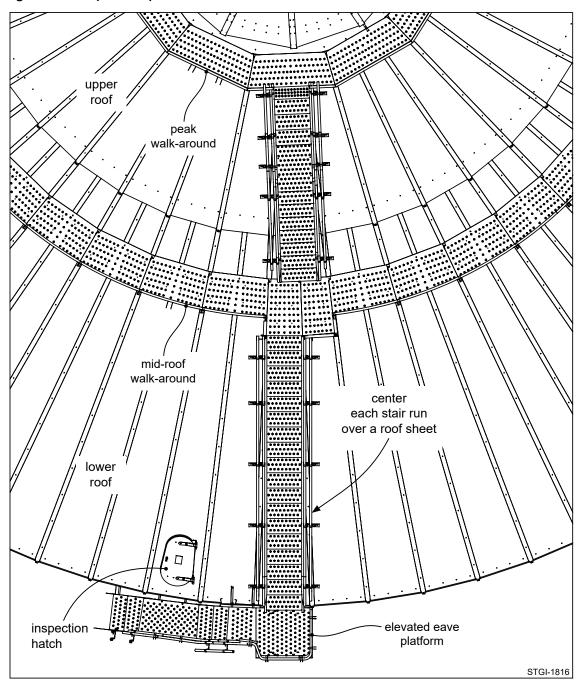


#### Figure 3. 75' (22.86 m) Plan View

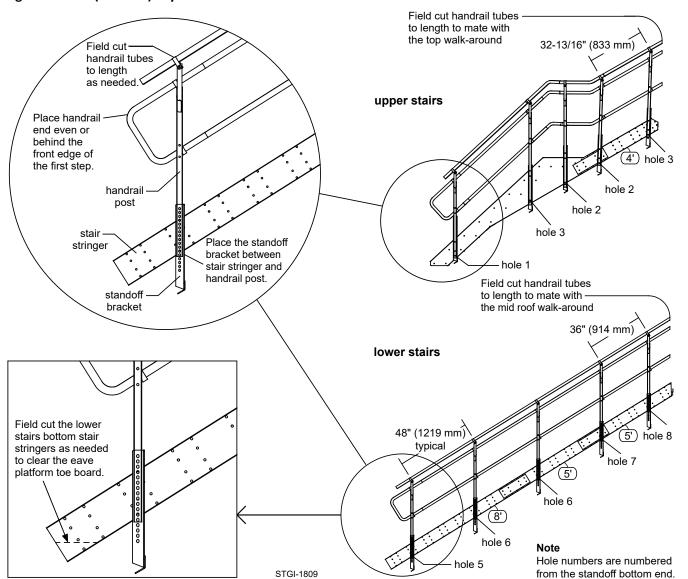




### 5.2.3 78' (23.77 m) Assembly Layout Views



#### Figure 5. 78' (23.77 m) Plan View



#### Figure 6. 78' (23.77 m) Layout Side Views

### 5.2.4 90' (27.43 m) Assembly Layout Views

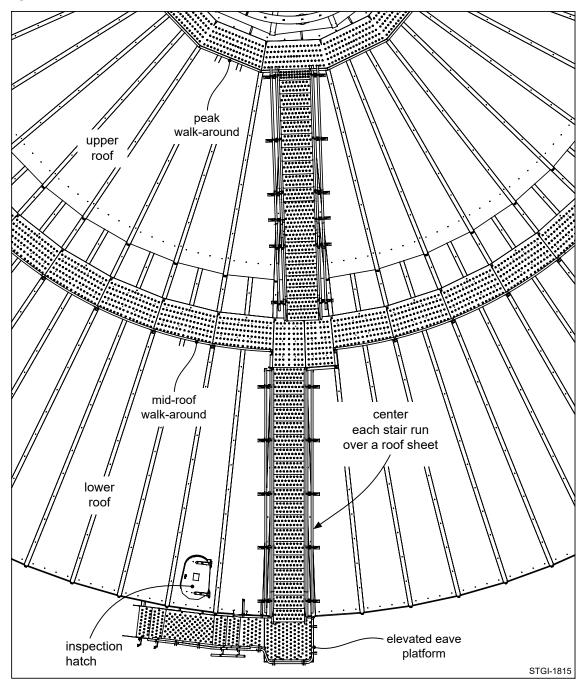
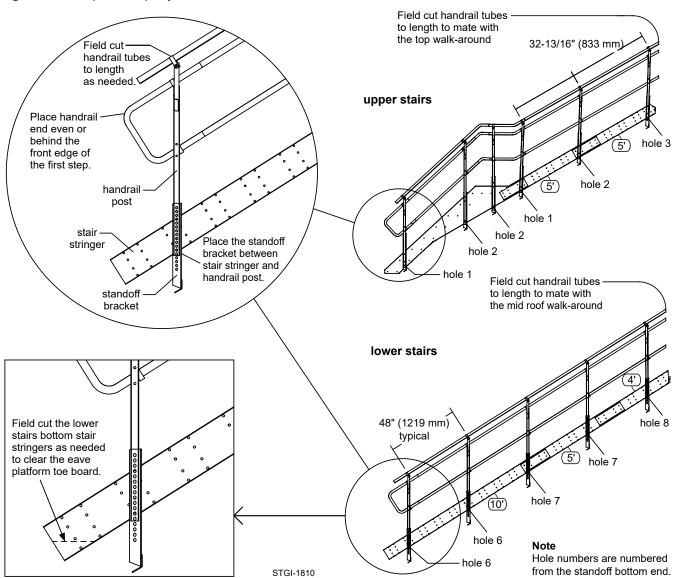
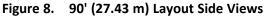
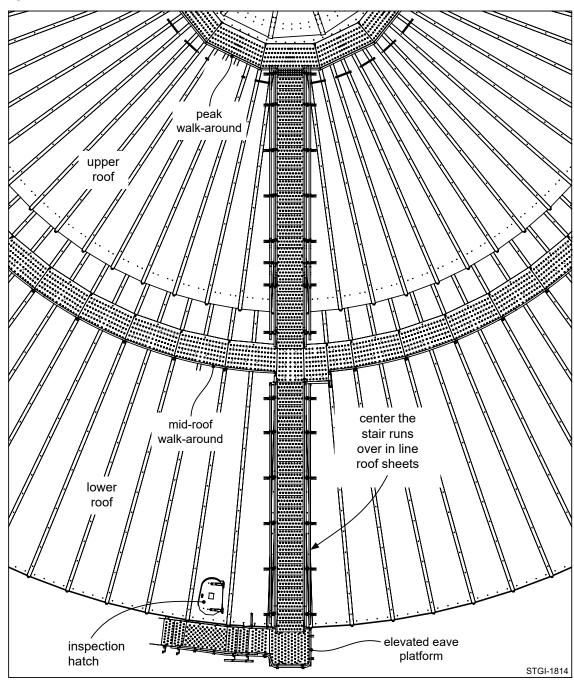


Figure 7. 90' (27.43 m) Plan View



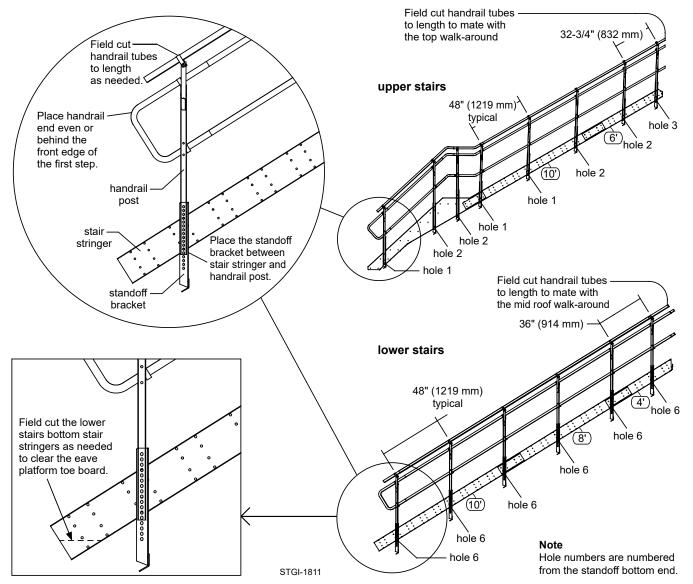


### 5.2.5 105' (32.00 m) Assembly Layout Views

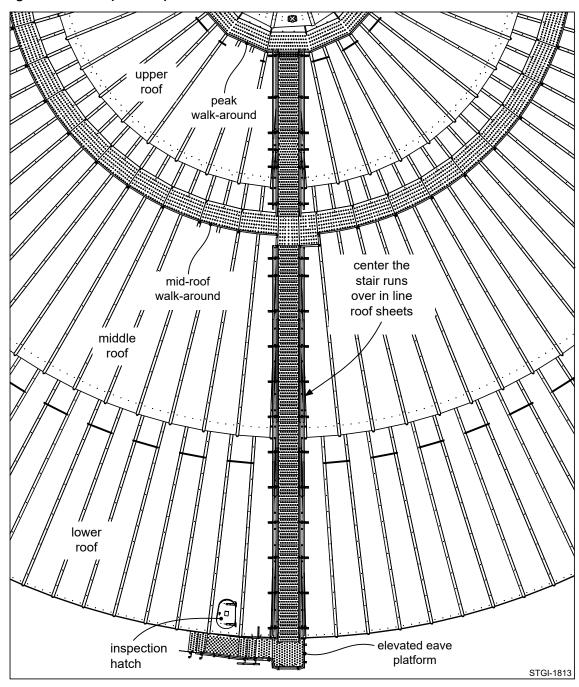


### Figure 9. 105' (32.00 m) Plan View

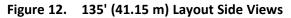


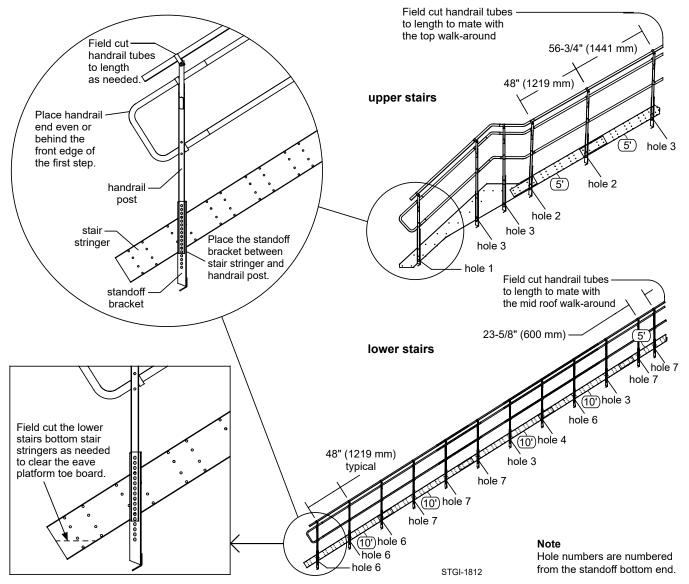


### 5.2.6 135' (41.15 m) Assembly Layout Views



#### Figure 11. 135' (41.15 m) Plan View





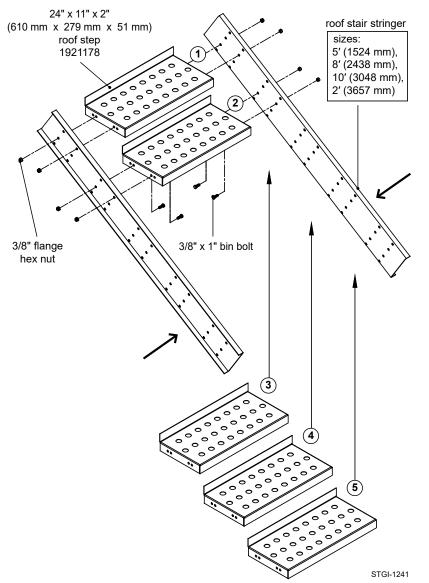
# 5.3. Installing the Steps, Stringers, and Splices

NOTICE

During assembly, check that each bolt faces in the correct direction so stair users will not be injured!

- 1. Loosely install all steps to the roof stair stringers. See the following figure.
  - a. Install steps to the correct holes as shown.
  - b. Use 3/8" x 1" bolts and flange nuts.
  - c. After all steps are in position, tighten all bolts.





2. AGI suggests first splice all stair sections together and then use a crane to install the roof stairs on the bin roof.

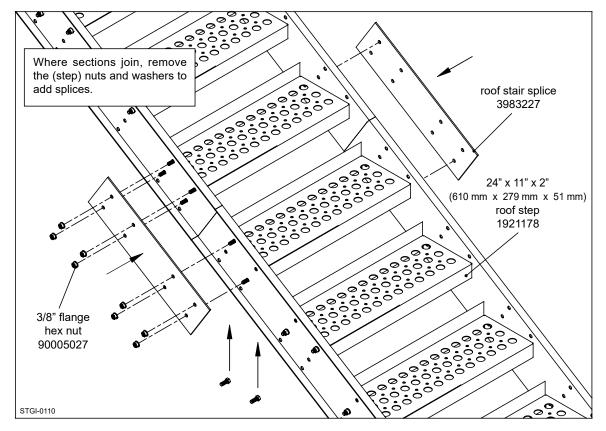
#### Note

Always install roof stair splices between stair sections before installing the roof stair standoff assemblies. Field drill the standoff holes in the grain bin roof from the outside of the grain bin.

#### Important

Install stair sections so the distance from the bottom step to the platform is where desired. Position the roof stairs in close alignment with the eave platform and the grain bin roof cap.

Figure 14. Installing Stair Section Splices



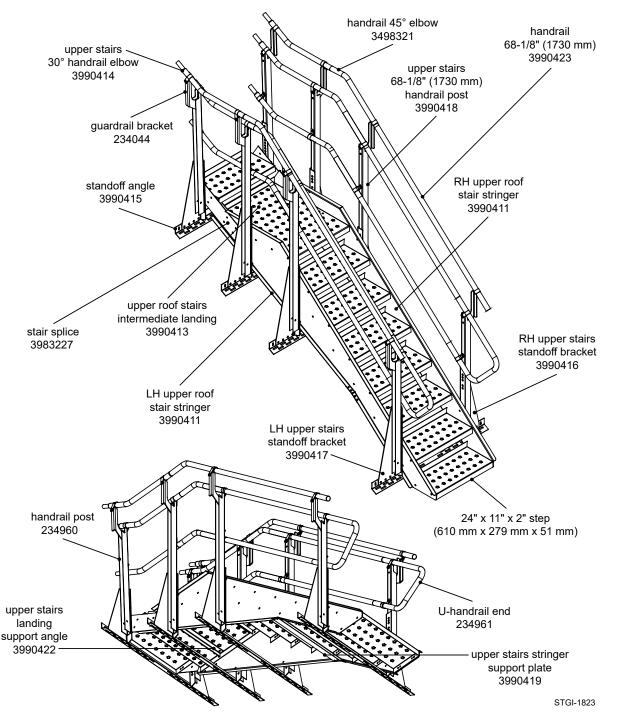
## 5.4. Assembling the Upper Roof Stairs Landing Section

#### Note

The upper roof stairs assembly includes a landing section assembly at the location where the stair rise over run changes.

Assemble together the upper roof stairs landing section as shown.

#### Figure 15. Example Roof Stairs Landing Section, Two Views

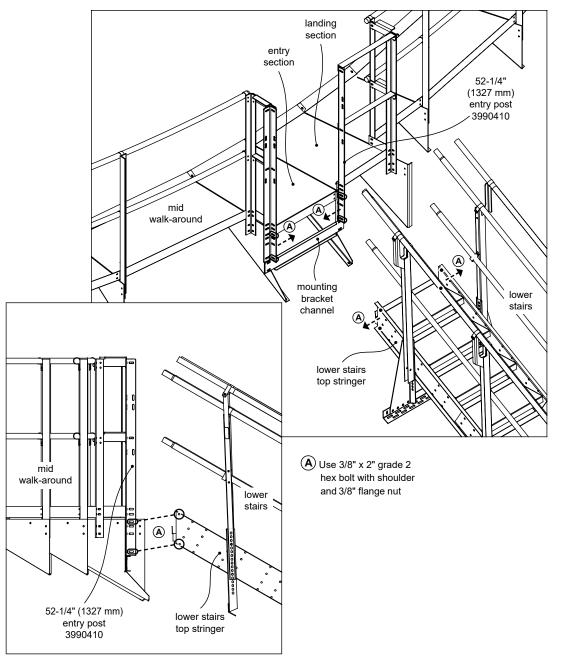


## 5.5. Connecting the Stair Runs to Walk-Arounds

### 5.5.1 Installing the Lower Stair Run To Mid Walk-Around

- 1. Connect the lower stair run top end to the mid walk-around as shown in the following figures.
- 2. Connect the designated four entry post holes and four lower stairs top stringer holes. Use 3/8" x 2" mounting bolts and 3/8" flange nuts..
- 3. Leave the stair sections connected to the crane rigging until roof standoff assemblies are safely secured to the roof.

Figure 16. Securing the Lower Stair Run to the Mid Walk-Around



4. Install guard rail brackets to the walk around entry posts, P-straps, and stair guard rails.

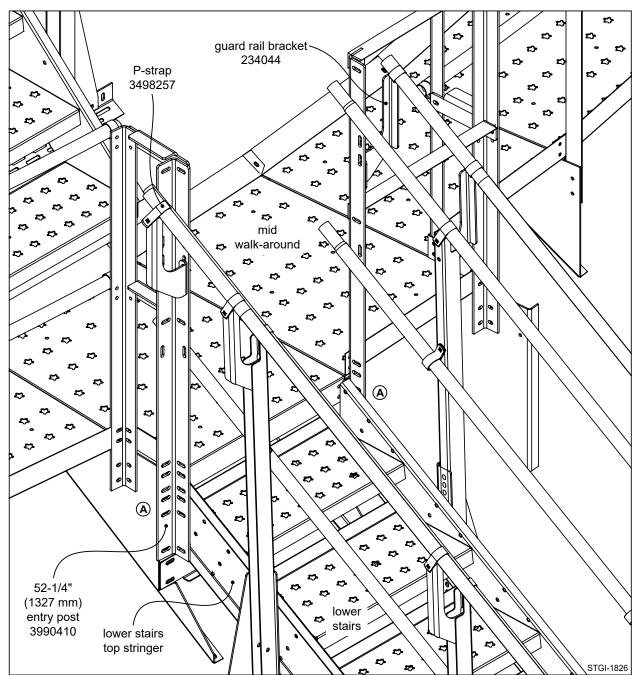
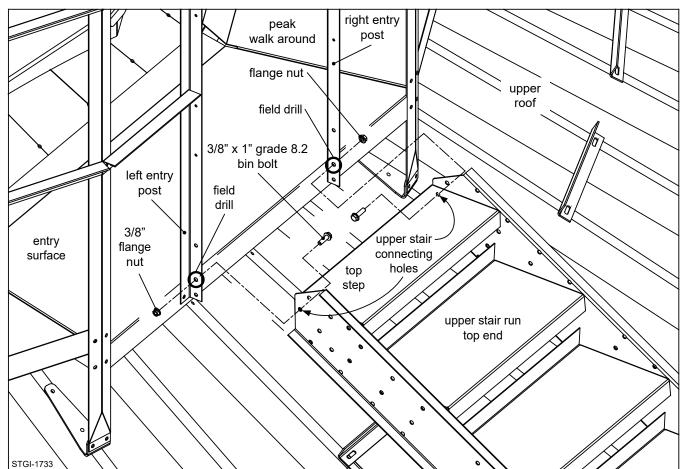


Figure 17. Lower Stair Run to Mid Walk-Around Completed Connection

### 5.5.2 Installing the Upper Stair Run To Peak Walk-Around

- 1. Assemble the upper stair run top end to the peak walk around as shown in the following figures.
- 2. Bring the upper stair run top end to meet with the peak walk around entry surface.
- 3. Eliminate any gap between the upper stair run top step and the entry surface.
- 4. Position the upper stair run top step so it is level with the entry surface.
- 5. Leave the stair sections connected to the crane rigging until roof standoff assemblies are safely secured to the roof.
- 6. Mark field drill hole locations in the right and left entry posts to meet with the upper stair connecting holes. Field drill these holes using a 3/8" drill bit.
- 7. Bolt the upper stair run top end to the peak walk around at the upper stair connecting holes and field drilled holes. Use 3/8" x 1" grade 8.2 bin bolts and 3/8" flange nuts.



#### Figure 18. Installing the Upper Stair Run to the Peak Walk-Around

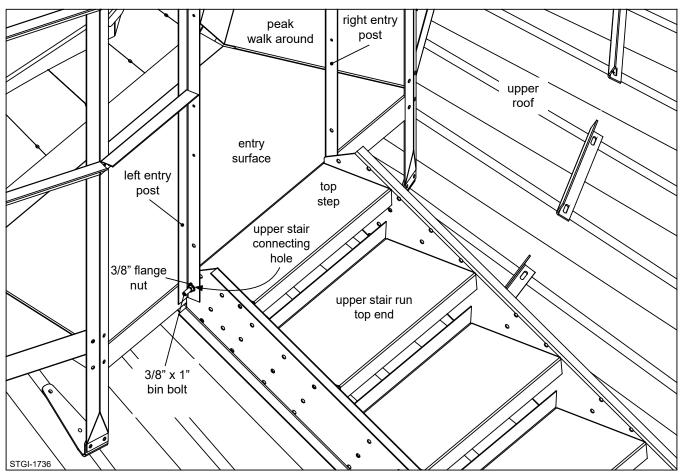


Figure 19. Upper Stair Run to the Peak Walk Around Completed Connection

## 5.6. Installing the Stair Runs to the Roof

- 1. Install roof stairs standoff brackets to roof stair stringers and to each roof stair post with 3/8" x 2" bolts and flange nuts as shown.
- 2. Center standoff angles below standoff bracket pairs and install standoff brackets to standoff angles as shown. Use 3/8" x 1" bin bolts (at least two bolts per standoff bracket).
- 3. Hoist the roof stairs into position on the roof.
- 4. Follow the instructions in the preceding manual section to install stair section top stringers to mid and peak walk arounds.
- 5. Leave the stair sections connected to the crane rigging until roof standoff assemblies are safely secured to the roof.
- 6. Install standoff angles to the roof sheet roof ribs as shown.
  - a. Field drill roof ribs standoff angle to roof sheet connection holes.
  - b. Use 3/8" x 1" bin bolts with seal washers and flange nuts. Install the bolt head and seal washer on the inside of the bin and the nut on the outside of the bin to prevent moisture leakage. (Use two bolts per each standoff bracket, one per each roof rib.)
  - c. Also use caulking as needed at standoff angle attachment hole locations to completely seal out moisture. (Caulking is not supplied with these assemblies by AGI).

7. When installing, have one person on the scaffolding (or other safe work structure) on the inside of the grain bin and two or more persons on the outside of the grain bin.

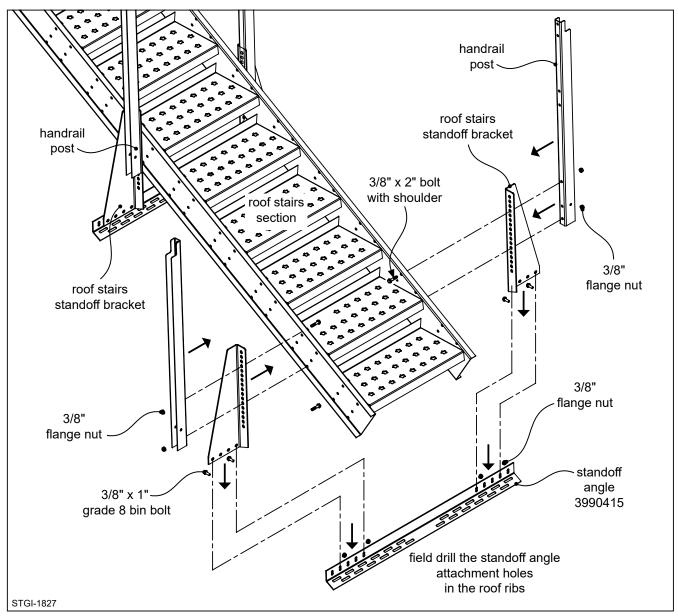


Figure 20. Roof Stair Standoff Assemblies Installation

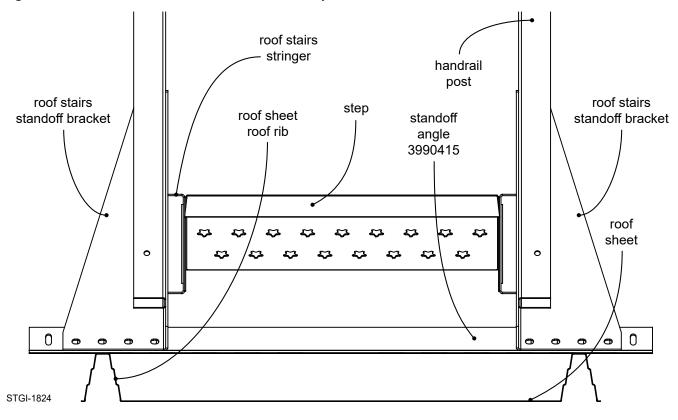
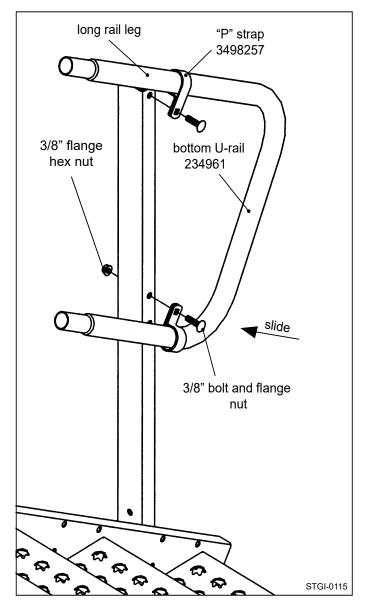


Figure 21. Assembled Roof Stair Standoff Assembly End View

## 5.7. Installing the Handrails and OSHA Guardrails

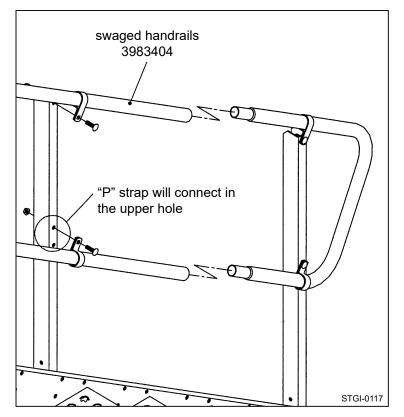
- 1. Install the U-handrail to the bottom roof stairs posts. Put the longer U-handrail leg at the top.
  - a. Install P-straps at the top of the post and at mid post to receive the U-handrail. See the following figure.
  - b. Leave nuts finger-tight.
  - c. Slide the U-handrail bottom bend as close to the lower P-strap as possible.
  - d. Leave hardware loose until all the rails have been installed to allow for any adjustment that may be required.



#### Figure 22. Bottom U-Handrail Installation

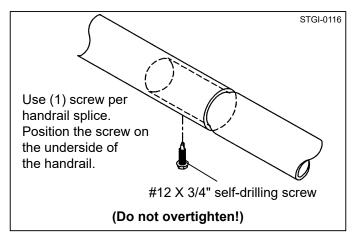
2. Start installing the rest of the handrails. See the following figure. Position the unswaged handrails at the handrail run end.

Figure 23. Install Connecting Handrails



3. Connect handrails together at handrail ends using self-drilling screws as shown in the following figure.

Figure 24. Self-Drilling Screw Connection / Splice Locations



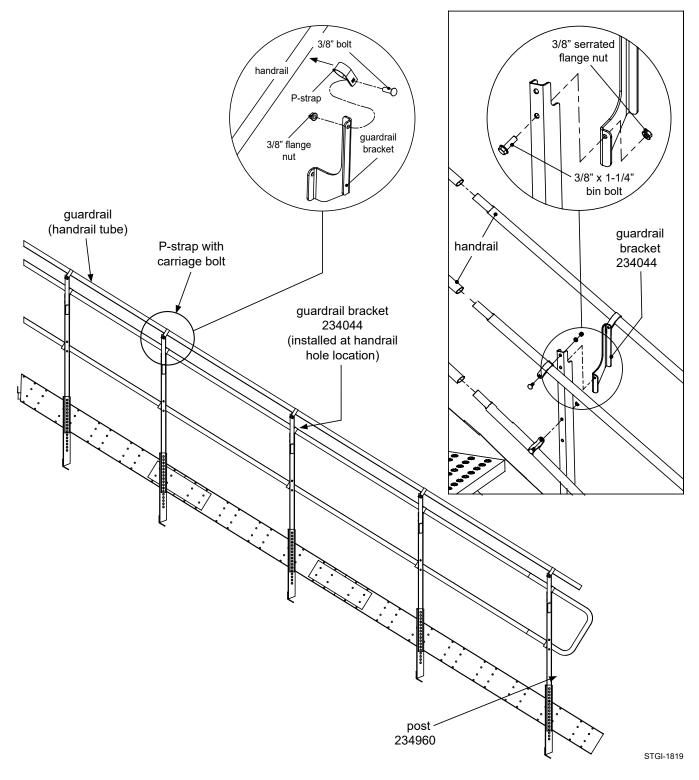
#### Note

When installing the roof stairs handrails, also install the guardrail brackets and guardrails along all stair inclines as shown in the following figures.

4. Install P-straps to posts and guardrail brackets using 3/8" bolts.

- 5. Install guardrail brackets to posts using 3/8" x 1-1/4" bin bolts.
- 6. Install handrails and guardrails through P-straps.

#### Figure 25. Connecting Guardrails to Posts Using P-straps and Guardrail Brackets



- 7. After the other handrails are in position tighten all assembly hardware.
- 8. Trim any excess handrails at the stairs upper end.

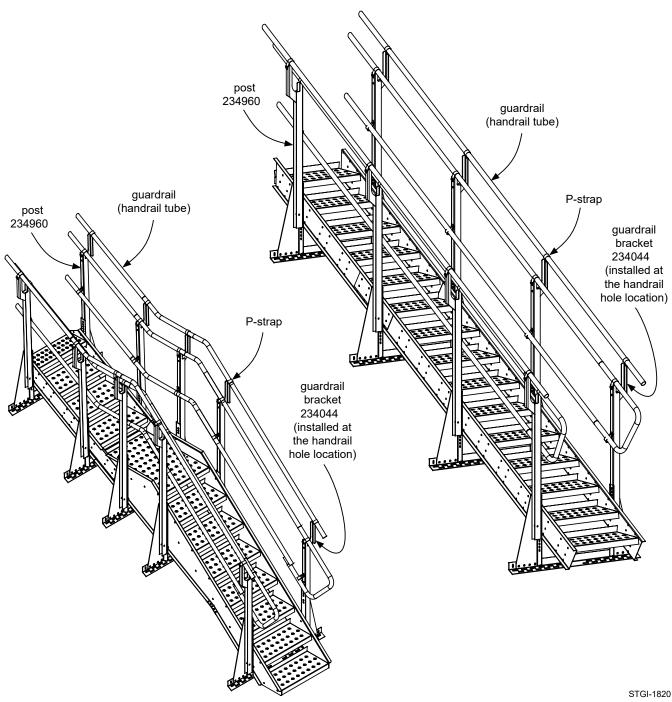
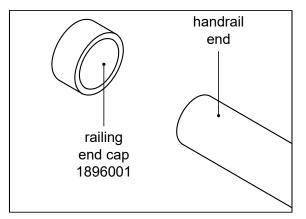


Figure 26. Installing the OSHA Guardrail

9. Finish the roof stair handrails installation. Install end caps at the railing ends.

# Figure 27. Install End Caps

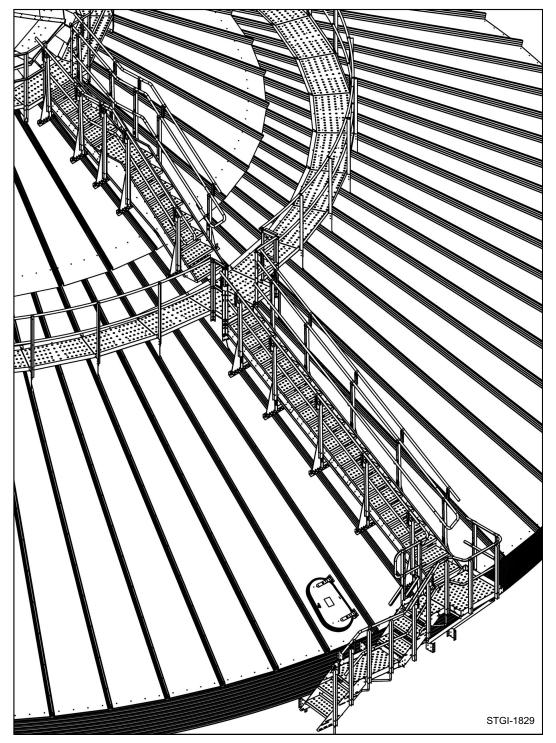


# 5.8. Example Completed Stairs

### Note

Your completed stairs should look similar but likely not exactly the same as the example below.

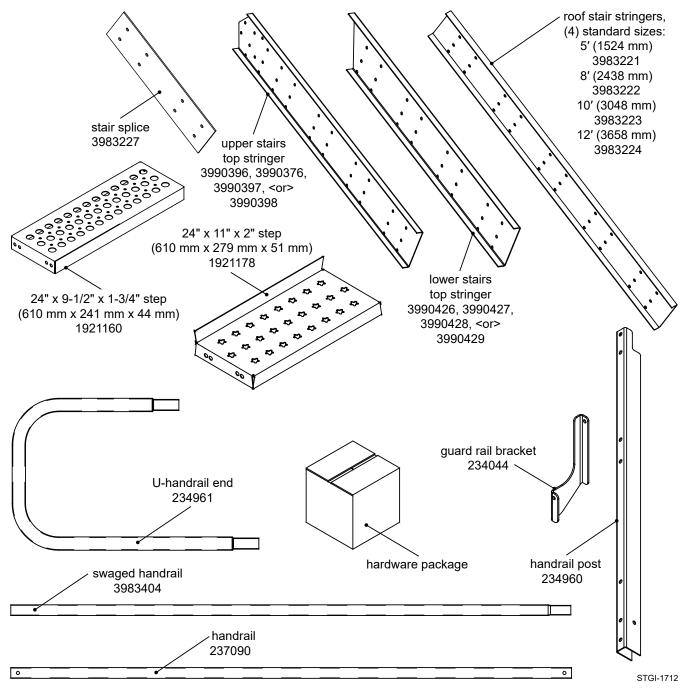
Figure 28. An Example Completed 78' (23.77 m) Stairs

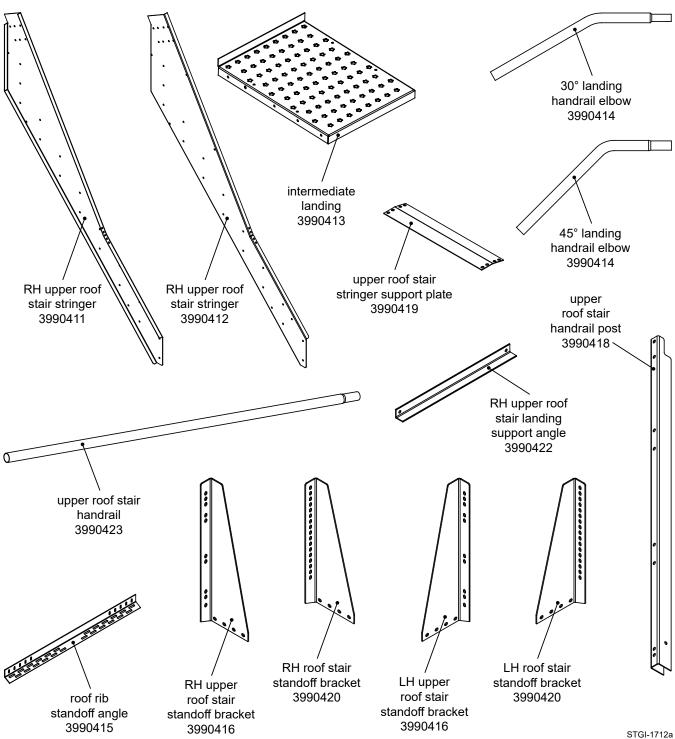


# 6. Appendix

# 6.1. Parts Identification

#### Figure 29. Parts Identification Drawing





#### Figure 30. Parts Identification Drawing (continued)

# 6.2. Parts Identification Tables

Part Number	Quantity	Description
1921178	15	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	8	handrail post
234044	8	guard rail bracket
234961	2	U-handrail end
3983404	6	swaged handrail, 237" (6020 mm) coverage
3990429	1	5 ft (1524 mm) lower stairs top stringer RH
3983223	2	10 ft (3048 mm) standard stringer
3990428	1	5 ft (1524 mm) lower stairs top stringer LH
3983227	2	stair splice
3990420	4	standoff bracket RH
3990421	4	standoff bracket LH
3990415	4	standoff angle

#### Table 1. 72' (21.95 m) Lower Stairs Package (4502433-1)

# Table 2. 72' (21.95 m) Upper Stairs Package (4502433-2)

Part Number	Quantity	Description
1921178	10	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	6	handrail post
234044	10	guard rail bracket
3983404	1	swaged handrail, 237" (6020 mm) coverage
3990413	1	upper roof stair intermediate landing
3990411	1	upper stairs bottom stringer RH
3498321	6	handrail post, 30" (762 mm) span
3990414	6	upper stairs landing handrail elbow, 30°
3990416	3	upper stairs standoff bracket RH
3990415	5	standoff angle
3990397	2	upper stairs 4 ft (1219 mm) top stringer
1921160	1	24" x 8.15" x 1-3/4" step (610 mm x 241 mm x 44 mm)
234961	2	U-handrail end
3990418	4	upper stairs handrail post
3983227	2	stair splice
3990422	2	upper stairs landing support angle
3990419	1	upper stairs stringer support plate
3990412	1	upper stairs bottom stringer LH
3990417	3	upper stairs standoff bracket LH
3990423	6	upper stairs handrail, 68-1/8" (1730 mm)
3990420	2	standoff bracket RH
3990421	2	standoff bracket LH

Part Number	Quantity	Description
1921178	14	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	8	handrail post
234044	8	guard rail bracket
234961	2	U-handrail end
3983404	6	swaged handrail, 237" (6020 mm) coverage
3983223	1	4 ft (1219 mm) lower stairs top stringer RH
3983223	2	10 ft (3048 mm) standard stringer
3990426	1	4 ft (1219 mm) lower stairs top stringer LH
3990420	4	standoff bracket RH
3990421	4	standoff bracket LH
3990415	4	standoff angle
3983227	2	roof stair splice plate

### Table 3. 75' (22.86 m) Lower Stairs Package (4502434-1)

# Table 4. 75' (22.86 m) Upper Stairs Package (4502434-2)

Part Number	Quantity	Description
1921178	13	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	8	handrail post
234044	12	guardrail bracket
3983404	2	swaged handrail, 237" (6020 mm) coverage
3990411	1	upper stairs bottom stringer RH
3498321	6	handrail post, 30" (762 mm) span
3990414	6	upper stairs landing handrail elbow, 30°
3990416	3	upper stairs standoff bracket RH
3990415	6	standoff angle
3990398	2	upper stairs 7 ft (2134 mm) top stringer
1921160	1	24" x 8.15" x 1-3/4" step (610 mm x 241 mm x 44 mm)
234961	2	U-handrail end
3990418	4	upper stairs handrail post
3983227	2	stair splice
3990422	2	upper stairs landing support angle
3990419	1	upper stairs stringer support plate
3990412	1	upper stairs bottom stringer LH
3990417	3	upper stairs standoff bracket LH
3990423	6	upper stairs handrail, 68-1/8" (1730 mm)
3990420	3	standoff bracket RH
3990421	3	standoff bracket LH

Part Number	Quantity	Description
1921178	18	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	10	handrail post
234044	10	guardrail bracket
234961	2	U-handrail end
3983404	6	swaged handrail, 237" (6020 mm) coverage
3983221	2	5 ft (2438 mm) standard stringer
3990429	1	5 ft (1524 mm) lower stairs top stringer RH
3983222	2	8 ft (2438 mm) standard stringer
3990428	1	5 ft (1524 mm) lower stairs top stringer LH
3983227	4	stair splice
3990420	5	standoff bracket RH
3990421	5	standoff bracket LH
3990415	5	standoff angle

Table 5. 78' (23.77 m) Lower Stairs Package (4502435-1)

### Table 6. 78' (22.86 m) Upper Stairs Package (4502435-2)

Part Number	Quantity	Description
1921178	10	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	6	handrail post
234044	10	guard rail bracket
3983404	1	swaged handrail, 237" (6020 mm) coverage
3990413	1	upper roof stair intermediate landing
3990411	1	upper stairs bottom stringer RH
3498321	6	handrail post, 30" (762 mm) span
3990414	6	upper stairs landing handrail elbow, 30°
3990416	3	upper stairs standoff bracket RH
3990415	5	standoff angle
3990397	2	upper stairs 4 ft (1219 mm) top stringer
1921160	1	24" x 8.15" x 1-3/4" step (610 mm x 241 mm x 44 mm)
234961	2	U-handrail end
3990418	4	upper stairs handrail post
3983227	2	stair splice
3990422	2	upper stairs landing support angle
3990419	1	upper stairs stringer support plate
3990412	1	upper stairs bottom stringer LH
3990417	3	upper stairs standoff bracket LH
3990423	6	upper stairs handrail, 68-1/8" (1730 mm)
3990420	2	standoff bracket RH
3990421	2	standoff bracket LH

Part Number	Quantity	Description
1921178	19	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	10	handrail post
234044	10	guard rail bracket
234961	2	U-handrail end
3983404	6	swaged handrail, 237" (6020 mm) coverage
3983223	2	10 ft (3048 mm) standard stringer
3983221	2	5 ft (2438 mm) standard stringer
3990427	1	4 ft (1219 mm) lower stairs top stringer RH
3990426	1	4 ft (1219 mm) lower stairs top stringer LH
3990420	5	standoff bracket RH
3990421	5	standoff bracket LH
3990415	5	standoff angle
3983227	4	stair splice

### Table 7. 90' (27.43 m) Lower Stairs Package (4502436-1)

#### Table 8. 90' (27.43 m) Upper Stairs Package (4502436-2)

Part Number	Quantity	Description
1921178	19	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	8	handrail post
234044	12	guard rail bracket
3983404	3	swaged handrail, 237" (6020 mm) coverage
3990413	1	upper roof stair intermediate landing
3990411	1	upper stairs bottom stringer RH
3498321	6	handrail post, 30" (762 mm) span
3990414	6	upper stairs landing handrail elbow, 30°
3990416	3	upper stairs standoff bracket RH
3990415	6	standoff angle
3990396	2	5 ft (1524 mm) upper stairs top stringer
1921160	1	24" x 8.15" x 1-3/4" step (610 mm x 241 mm x 44 mm)
234961	2	U-handrail end
3990418	4	upper stairs handrail post
3983227	4	stair splice
3990422	2	upper stairs landing support angle
3990419	1	upper stairs stringer support plate
3990412	1	upper stairs bottom stringer LH
3990417	3	upper stairs standoff bracket LH
3990423	6	upper stairs handrail, 68-1/8" (1730 mm)
3990420	3	standoff bracket RH
3990421	3	standoff bracket LH
3983221	2	5 ft (2438 mm) standard stringer

Part Number	Quantity	Description
3983223	2	10 ft (3048 mm) standard stringer
3990427	1	4 ft (1219 mm) lower stairs top stringer RH
1921178	22	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	12	handrail post
234044	12	guard rail bracket
234961	2	U-handrail end
3983404	6	swaged handrail, 237" (6020 mm) coverage
237090	1	handrail, 240" (6096 mm)
3983222	2	8 ft (2438 mm) standard stringer
3990426	1	4 ft (1219 mm) lower stairs top stringer LH
3990420	6	standoff bracket RH
3990421	6	standoff bracket LH
3990415	6	standoff angle
3983227	4	stair splice

Table 9. 105' (32.00 m) Lower Stairs Package (4502437-1)

Table 10.	105' (32.00 m) Upper Stairs Package (4502437-2)
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Part Number	Quantity	Description
1921178	22	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	12	handrail post
234044	16	guard rail bracket
3983404	6	swaged handrail, 237" (6020 mm) coverage
3990413	1	upper roof stair intermediate landing
3990411	1	upper stairs bottom stringer RH
3498321	6	handrail post, 30" (762 mm) span
3983223	2	10 ft (3048 mm) standard stringer
3990414	6	upper stairs landing handrail elbow, 30°
3990416	3	upper stairs standoff bracket RH
3990415	8	standoff angle
3990376	2	6 ft (1829 mm) upper stairs top stringer
1921160	1	24" x 8.15" x 1-3/4" step (610 mm x 241 mm x 44 mm)
234961	2	U-handrail end
3990418	4	upper stairs handrail post
3983227	4	stair splice
3990422	2	upper stairs landing support angle
3990419	1	upper stairs stringer support plate
3990412	1	upper stairs bottom stringer LH
3990417	3	upper stairs standoff bracket LH
3990423	6	upper stairs handrail, 68-1/8" (1730 mm)
3990420	5	standoff bracket RH
3990421	5	standoff bracket LH
4502437A-2	1	105' (32.00 m) upper stairs hardware package

Part Number	Quantity	Description
3983223	8	10 ft (3048 mm) standard stringer
1921178	45	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick
234960	24	handrail post
234044	24	guard rail bracket
234961	2	U-handrail end
3983404	12	swaged handrail, 237" (6020 mm) coverage
237090	2	handrail, 240" (6096 mm)
3990429	1	5 ft (1524 mm) lower stairs top stringer RH
3990428	1	5 ft (1524 mm) lower stairs top stringer LH
3983227	8	stair splice
3990420	12	standoff bracket RH
3990421	12	standoff bracket LH
3990415	12	standoff angle

Table 11. 135' (41.15 m) Lower Stairs Package (4502438-1)

Part Number	Quantity	Description	
1921178	16	24" x 11" x 2" step (610 mm x 279 mm x 51 mm) with toe kick	
234960	8	handrail post	
234044	12	guard rail bracket	
3983404	3	swaged handrail, 237" (6020 mm) coverage	
3990413	1	upper roof stair intermediate landing	
3990411	1	upper stairs bottom stringer RH	
3498321	6	handrail post, 30" (762 mm) span	
3990414	6	upper stairs landing handrail elbow, 30°	
3990416	3	upper stairs standoff bracket RH	
3990415	6	standoff angle	
3990396	2	5 ft (1524 mm) upper stairs top stringer	
1921160	1	24" x 8.15" x 1-3/4" step (610 mm x 241 mm x 44 mm)	
234961	2	U-handrail end	
3990418	4	upper stairs handrail post	
3983227	4	stair splice	
3990422	2	upper stairs landing support angle	
3990419	1	upper stairs stringer support plate	
3990412	1	upper stairs bottom stringer LH	
3990417	3	upper stairs standoff bracket LH	
3990423	6	upper stairs handrail, 68-1/8" (1730 mm)	
3990420	3	standoff bracket RH	
3990421	3	standoff bracket LH	
3983221	2	5 ft (2438 mm) standard stringer	

# **6.3.** Hardware Identification Tables

Part Number	Quantity	Description	
1896001	16	handrail end cap	
3498257	66	P-strap	
235941	1	3/8" x 1" grade 8.2 bin bolt (bag of 325)	
235977	1	3/8" x 2" grade 2 hex bolt with shoulder (bag of 125)	
235954	2	3/8" grade 5 flange nut (bag of 300)	
234131	4	#12 x 3/4" self drilling screw (bag of 12)	
235917	1	5/16" x 1-1/4" grade 8.2 bin bolt (bag of 50)	
235925	1	5/16" flange hex nut (bag of 50)	
4000026F	1	mid-roof walk-around stairs manual	

# Table 13.72' (21.95 m) Hardware Package

### Table 14. 75' (22.86 m) Hardware Package

Part Number	Quantity	Description	
1896001	16	handrail end cap	
3498257	72	P-strap	
235941	1	3/8" x 1" grade 8.2 bin bolt (bag of 325)	
235977	1	3/8" x 2" grade 2 hex bolt with shoulder (bag of 125)	
235954	2	3/8" grade 5 flange nut (bag of 300)	
234131	4	#12 x 3/4" self drilling screw (bag of 12)	
235917	1	5/16" x 1-1/4" grade 8.2 bin bolt (bag of 50)	
235925	1	5/16" flange hex nut (bag of 50)	
4000026F	1	mid-roof walk-around stairs manual	

6. APPENDIX

Part Number	Quantity	Description	
1896001	16	handrail end cap	
3498257	72	P-strap	
235941	1	3/8" x 1" grade 8.2 bin bolt (bag of 325)	
235977	1	3/8" x 2" grade 2 hex bolt with shoulder (bag of 125)	
235954	2	3/8" grade 5 flange nut (bag of 300)	
234131	4	#12 x 3/4" self drilling screw (bag of 12)	
235917	1	5/16" x 1-1/4" grade 8.2 bin bolt (bag of 50)	
235925	1	5/16" flange hex nut (bag of 50)	
4000026F	1	mid-roof walk-around stairs manual	

# Table 15. 78' (23.77 m) Hardware Package

Table 16. 90' (27.43 m) Hardware Package

Part Number	Quantity	Description	
1896001	16	handrail end cap	
3498257	78	P-strap	
235941	2	3/8" x 1" grade 8.2 bin bolt (bag of 325)	
235977	1	3/8" x 2" grade 2 hex bolt with shoulder (bag of 125)	
235954	2	3/8" grade 5 flange nut (bag of 300)	
234131	4	#12 x 3/4" self drilling screw (bag of 12)	
235917	1	5/16" x 1-1/4" grade 8.2 bin bolt (bag of 50)	
235925	1	5/16" flange hex nut (bag of 50)	
4000026F	1	mid-roof walk-around stairs manual	

Part Number	Quantity	Description	
1896001	16	handrail end cap	
3498257	96	P-strap	
235941	2	3/8" x 1" grade 8.2 bin bolt (bag of 325)	
235977	1	3/8" x 2" grade 2 hex bolt with shoulder (bag of 125)	
235954	2	3/8" grade 5 flange nut (bag of 300)	
234131	4	#12 x 3/4" self drilling screw (bag of 12)	
235917	1	5/16" x 1-1/4" grade 8.2 bin bolt (bag of 50)	
235925	1	5/16" flange hex nut (bag of 50)	
4000026F	1	mid-roof walk-around stairs manual	

Table 17. 105' (32.00 m) Hardware Package

Table 18. 135' (41.15 m) Hardware Package

Part Number	Quantity	Description	
1896001	16	handrail end cap	
3498257	120	P-strap	
235941	2	3/8" x 1" grade 8.2 bin bolt (bag of 325)	
235977	1	3/8" x 2" grade 2 hex bolt with shoulder (bag of 125)	
235954	3	3/8" grade 5 flange nut (bag of 300)	
234131	5	#12 x 3/4" self drilling screw (bag of 12)	
235917	1	5/16" x 1-1/4" grade 8.2 bin bolt (bag of 50)	
235925	1	5/16" flange hex nut (bag of 50)	
235973	2	5/16" STL/NEO seal washer (bag of 25)	
235935	1	3/8" x 1-1/2" grade 8.2 HFW bolt (bag of 55)	
235946	1	3/8" x 1-1/2" grade 8.2 HFW bolt (bag of 100)	
4000026F	1	mid-roof walk-around stairs manual	

# 6.4. Recommended Bolt Assembly

When tightening bolts, tighten the nut on the bolt until a "snug-tightened condition" has been achieved. A "snug-tightened condition" is defined in *Specification for Structural Joints Using ASTM A325 or A490 Bolts* (Research Council on Structural Connections: June 2004), which states:

"The snug-tightened condition is the tightness that is attained with a few impacts of an impact wrench or the full effort of an ironworker using an ordinary spud wrench to bring the connected plies into firm contact."

A properly tightened bolt will compress the sealing washer noticeably. All assembly crew members must be made aware of this requirement, and must know how to achieve a snug-tightened condition using common bin-building tools.

It is important that the bolts in the vertical wall sheet seams are tightened enough to squeeze the caulking and bring the wall sheet surfaces into firm contact with each other. This is especially important to monitor when installing bolts in temperatures approaching -10°C (14°F).

The following table shows the minimum impact gun torque capacity necessary to achieve a snug-tightened condition for bolts used in the assembly process.

Bolt Diameter	Bolt Grade	Grade Mark	Recommended Torque Capacity		
Boit Diameter			in-lb	ft-lb	N-m
1/4"	Grade 8.2		75	6	8
5/16"	Grade 8.2		215	18	24
3/8"	Grade 8.2	84 <u>8</u>	370	31	42
7/16"	Grade 8.2	ser	600	50	68
1/2"	Grade 8.2		960	80	108
5/8"	Grade 8.2		1800	150	203
3/4"	Grade 5	$\langle \rangle$	3230	269	365

#### Table 19. Recommended Impact Gun Torque Values Capacity to Achieve Snug-Tightened Bolts

For proper sealing, do not overtighten the wall seam connections. Sealing is not critical on stiffener splice connections; these connections should be tightened securely to prevent loosening.

Hold the bolt head securely when tightening the nut to prevent damage to the sealing washer.

#### Important

Always tighten the nut, not the bolt.

Avoid bin assembly at temperatures below -10°C (14°F) if possible. Erection in low temperatures does not ensure strong, well sealed connections. Do not substitute bolts in place of those supplied by AGI.

#### Important

Do not substitute any other bolts/fasteners for those supplied by the AGI factory.

# 7. Warranty

#### **AGI Grain Bin Products**

Ag Growth International, Inc. ("AGI") warrants that the goods and/or services being supplied (the "Goods") will be free from defects in materials and workmanship under normal conditions, use, service, and maintenance, for a period of twelve (12) months from the date of first operation of the Goods, but in no event more than eighteen (18) months from the date of delivery of the Goods to the end-user (or as otherwise set out in the chart below) (the "Warranty Term"). If the Goods are being used for rental purposes, the Warranty Term for the subject Goods shall be limited to 90 days.

Galvanized Bins	5 Years			
SureTrack	2 Years			
Easyflow2	2 Years			
Fans	3 Years			
Heaters	1 Year			
Side Draw	5 Year			
Transitions	3 Years			
Roof Exhauster	1 Year			
Floors	5 Years			
Catwalk	1 Year			
Bulk Feed Tanks	2 Years			
Hopper Tanks	5 Year			
SeedSto	or-K Cones			
Paint	1 Year			
Structural	10 Year			
Commercia	l HBB Hopper			
Paint	1 Year			
Structural	10 Year			
Weldee	d Cone(s)			
Paint	1 Year			
Structural	10 Year			
Farm Smo	othwall Bins			
Paint	1 Year			
Structural	10 Year			
Commercial S	moothwall Bins			
Paint	1 Year			
Structural	10 Year			
	Accessories			
Trolley	1 Year			
Down Auger	1 Year			
Disconnected Box	1 Year			
Grain Spreader	1 Year			
EasyDry /	EasyDry Accessories			
Plenum	5 Year			
Controls	1 Year			
Blower Heater	1 Year			

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The customer shall not assert a claim that the Goods are defective unless the customer gives written notice to AGI of such defect within forty-eight (48) hours of discovering such defect. In the event of a warranty claim, the customer must complete any and all information

required by AGI in order to properly assess or investigate the claim. AGI shall be given a reasonable opportunity to inspect and test the Goods in question. Failure by the customer to notify AGI of such claim within 48 hours shall operate as a waiver of any and all such claims by the customer.

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